



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/524,408	03/13/2000	Kanad Chakraborty	YO999-598	7403

48150 7590 07/05/2005

MCGINN & GIBB, PLLC  
8321 OLD COURTHOUSE ROAD  
SUITE 200  
VIENNA, VA 22182-3817

EXAMINER

CRAIG, DWIN M

ART UNIT PAPER NUMBER

2123

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

h

## Office Action Summary

Application No.

09/524,408

Applicant(s)

CHAKRABORTY ET AL.

Examiner

Dwin M Craig

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3,6,12,24,27,33,40-46 and 48-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 3, 6, 12, 24, 27, 33, 40-46 and 48-58 are being presented for reconsideration in view of Applicants' amended claim language, arguments and Request for Continued Prosecution (RCE) under 37 CFR 1.114. Claims 1, 2, 4, 5, 7-11, 13-23, 25, 26, 28-32, 34, 35-39 and 47 have been cancelled.

#### Response to Arguments

2. Applicant's arguments presented in the 4/25/2005 responses have been fully considered. The Examiner's response is as follows.

2.1 Regarding the Applicants' response to the 35 USC § 112 rejections of claims 3, 6, 12 and 41. The Examiner thanks the Applicant for amending the current claim language and clarifying the metes and bounds of the expressly claimed limitations in claims 3, 6, 12 and 41. The Examiner withdraws the earlier 35 USC 112 rejections of those claims.

2.2 Regarding the 35 USC § 102(e) rejections of claims 3, 6, 12, 24, 27, 33, 40-46 and 48-55.

Applicant argued on page 13 of the 4/25/2005 response,

*"In contrast, in[sic] the present invention if the considered netlist modification and considered cell placement do not improve at least one domain of the design space, while leaving all other domains of the domain space satisfactory, a different possible netlist modification for the design space is considered, along with a cell placement for this design space. Thus, the time effort and expense of implementing a netlist modification and cell placement that are unsatisfactory are avoided. The final rejection ignores, and does not respond to, the argument presented in the previous amendment that the considered netlist modification and cell placement are not implemented until and unless it is determined that they improve the design space."*

The Examiner respectfully traverses Applicant's arguments. The Examiner notes that Applicants' have argued on page 13 that *"The user must take action, either to undertake a new design, layout and testing process or to override the message and accept the[sic] design with the*

Art Unit: 2123

*problem.*” The Examiner notes that Applicant’s have argued that the *Shenoy* reference inherently teaches the step of having a determination made by a user if a design improvement will take place. The Examiner notes that this is equivalent to the expressly claimed limitation of, “*netlist modification and cell placement are not implemented until it is determined that they improve the design.*” There is no expressly claimed limitation in the current claim language that precludes a user from making this determination in claims 40, 46 and 50.

The Examiner upholds the earlier 35 USC 102(e) rejections of claims 3, 6, 12, 24, 27, 33, 40-46 and 48-55.

**Claim Rejections - 35 USC § 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 3, 6, 12, 40-45, 46, 48, 49, 24, 27 and 33 are rejected under 35 USC § 101 because the claims are directed towards an abstract series of steps that could be performed using a pencil and paper and not a tangible embodiment on a computer system. For Example, if the current claim language of Independent claim 40 were amended to say, “*A method, using a computer, of modifying a plurality of domains of a circuit in a design space...*” This claim language form disclosed in the preceding sentence would clearly disclose the invention being directed to an Electronic Design Automation (EDA) tool, which would then make the claim be statutory.

***From the MPEP: Chapter 700, Patentable Subject Matter—Computer-related Inventions:***

**Identify and Understand Any Practical Application Asserted for the Invention**  
The claimed invention as a whole must accomplish a practical application. That is, it must produce a “useful, concrete and tangible result.” State

Art Unit: 2123

Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.

Amendment is required.

**Claim Rejections - 35 USC § 102(e) filed before 11/29/00 and not vol. Pub. Under 35 USD 122(b)**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. **Claims 3, 6, 12, 24, 27, 33, 40-46 and 48-58** are rejected under 35 USC § 102(e) as anticipated by Shenoy US patent 6,378,114.

4.1 Taking independent claim 40 as an example, the *Shenoy* reference teaches,

4.2 **"(a) considering a possible netlist modification for the design space"** is disclosed by *Shenoy* at **column 1 line 54** "several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration", and **column 3 line 32** "after cell separation is performed, the netlist is tweaked to optimize the design", and **FIG 1**.

4.3 **"(b) considering a cell placement for the modified netlist"** is disclosed by *Shenoy* at **column 1 line 54** "several iterations... to optimize... each of these stages is highly dependent on

the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.4 “(c) determining whether the considered netlist modification and the considered cell placement improve the design space”** is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.5 “(d) if the considered netlist modification and the considered cell placement improve the design space, implementing the considered netlist modification and the considered cell placement, but if the considered netlist modification and the considered cell placement to do not improve the design space, returning to (a)”** is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.6** Note that the McGraw-Hill Dictionary definition for “optimization” is “[MATH] The maximizing or minimizing of a given function possibly subject to some type of constraints. [SYS ENG] 1. Broadly, the efforts and processes of making a decision, a design, or a system as perfect, effective, or functional as possible. 2. Narrowly, the specific methodology, techniques, and procedures used to decide on the one specific solution in a defined set of possible alternatives that will best satisfy a selected criterion. Also known as system optimization.”

**4.7 Note the newly amended limitations**, while leaving all other domains of the design *space* satisfactory. As opined by the Applicant this is an inherent feature of the *Shenoy* reference, see section 2.2 above and **Col. 3 lines 35-41** of *Shenoy*.

**4.8 Claims 3, 6, 12 and 41-45** depend from independent **claim 40**.

**4.9** In claim 3, “the netlist modification is divided into a set of steps, each step addressing a specific aspect of the design space” is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the

Art Unit: 2123

other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.10** In **claim 6**, “**the modification affects multiple objectives and constraints which involve physical placement, electrical properties, and logical data**” is disclosed in *Shenoy* in **column 5 line 2** “the chips performance characteristics (e.g., timing, dock, frequency, power level, skew, delay, etc.” discloses the plurality of data disclosed in Applicant’s expressly claimed limitations.

**4.11** In **claim 12**, “at predetermined stages of the method, selectively determining whether to intercept the method and implement the most recently considered netlist modification and cell placement” is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.12** In **claim 41**, “**wherein considering a cell placement comprises considering a plurality of placement techniques**” is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.13** In **claim 42**, “the design space is divided into bins, and (a) through (c) are performed on a bin” is disclosed by *Shenoy* at **abstract** “plurality of partitions”.

**4.14** In **claim 43**, “**determining whether further improvement of the design space should be sought; and if so, returning to (a)**” is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.15** In **claim 44**, “**making an initial layout for the design space**” is disclosed by *Shenoy* at **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive

Art Unit: 2123

iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.16** In claim 45, “storing information to update data about the implemented netlist and cell placement” is disclosed by *Shenoy* at **Abstract** “computer controlled” and **column 1 line 54** “several iterations... to optimize... each of these stages is highly dependent on the results of the other stages... the overall design might sometimes be worse in a successive iteration”, and **column 3 line 32** “after cell separation is performed, the netlist is tweaked to optimize the design”, and **FIG 1**.

**4.17** Claims 24, 27, 33, 48 and 49 are “system” (machine) type claims with the same limitations as “method” claims 3, 6, 12, and 41-45, and thus are rejected for the same reasons.

**4.18** Claims 50-58 are “programmable storage medium” type claims with the same limitations as “method” claims 3, 5, 6, 12, 13, and 41-45, and thus are rejected for the same reasons.

### **Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**5.** Claims 40, 46 and 50 are rejected under 35 USC § 102(b) as anticipated by **Hathaway et al. US Patent 5,757,675**.

**5.1** As regards independent claims 40, 46 and 50 and using claim 40 as an example, the *Hathaway et al.* reference teaches, **Fig. 1** and **Col. Line 44** “The fifth step is shown in block 5 of Fig. 1 A list of at least one change in the design specification is accepted. After each incremental design change affecting placement should updated (e.g., as result of a change in the netlist). This includes specifying circuits which have been deleted and those which have been added.”

**5.2** As regards the method steps Applicant has claimed see **Fig. 1** and **Col. 5 lines 10 et seq.**



Art Unit: 2123

**Conclusion**

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Examiner has cited the following references because they are related to Applicants' disclosed limitations in that they all teach interactive methods of cell placement in ASIC design.

US Patent 6,449,761

US Patent 6,026,226

US Patent 6,446,239

6.1 Claims 3, 6, 12, 24, 27, 33, 40-46 and 48-58 are being presented for reconsideration. Claims 3, 6, 12, 24, 27, 33, 40-46 and 48-58 have been rejected.

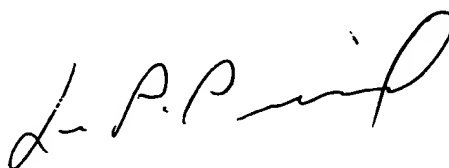
6.2 This Office Action is **Non-Final**.

6.3 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwain M Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DMC



LEO PICARD  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100